

IMAGE RETRIEVAL AND PROCESSING SYSTEM VERSION 2.0 DEVELOPMENT WORK

Susan Slavney and Edward A. Guinness, McDonnell Center for the Space Sciences, Department of Earth and Planetary Sciences, Washington University, St. Louis, Missouri 63130.

The Image Retrieval and Processing System (IRPS) is a software package developed at Washington University and used by the NASA Regional Planetary Image Facilities (RPIFs). IRPS combines data base management and image processing components to allow the user to examine catalogs of image data, locate the data of interest, and perform radiometric and geometric calibration of the data in preparation for analysis. Version 1.0 of IRPS was completed in August, 1989 and has been installed at several RPIFs. Other RPIFs use remote logins via NASA Science Internet to access IRPS at Washington University.

We have begun work on designing and populating a catalog of Magellan image products that will be part of IRPS Version 2.0, planned for release by the end of calendar year 1991. With this catalog, a user will be able to search by orbit and by location for Magellan Basic Image Data Records (BIDRs), Mosaicked Image Data Records (MIDRs), and Altimetry-Radiometry Composite Data Records (ARCDRs). The catalog will include the Magellan CD-ROM volume, directory and file name for each data product.

The image processing component of IRPS is based on the Planetary Image Cartography Software (PICS) developed by the USGS, Flagstaff, Arizona. To augment PICS capabilities, we have developed a set of image processing programs that are compatible with PICS-format images. This software includes general-purpose functions that PICS does not have, analysis and utility programs for specific data sets, and programs from other sources that have been modified to work with PICS images. Some of the software will be integrated into the Version 2.0 release of IRPS.

The table below lists the programs alphabetically with a brief functional description of each.

PICS-COMPATIBLE SOFTWARE DEVELOPED AT WASHINGTON UNIVERSITY

<u>Program</u>	<u>Description</u>
AZELINC	Compute the solar elevation and azimuth throughout a day
AVERSPEC	Average up to 5 Daedalus spectrometer files
BOXGEN	Generate a test image consisting of a set of boxes
BGRHUE	Transform color to hue, saturation, and brightness
CUT	Copy a section of an image to a new file
DESPIKE	Remove spikes in an image
DIF	Create a difference image
EXPAND	Increase the size of an image
FHIST	Histogram of 32-bit floating-point image
GEN	Generate a test pattern
HAPKE3	Solve the Hapke photometric function
HAPREF	Solve the Hapke photometric function
HISTOGRAM	Generate image histogram (byte image)

HUERGB	Transform hue, saturation and intensity to color
IHIST	Histogram of 16-bit signed integer image
IMUSE	List image disk space by user
INSERT	Insert an image into a mosaic
LABELTEST	Test image label processing routines
LASSCAN	Scan labels on an LAS tape
LASTAPE	Read images from tape in LAS format to disk in PICS format
LEAF	Combines a set of bands into one band-interleaved image
LINCMB	Perform a linear combination of images
LISTPIXEL	List pixel values in an image
LOADLUT	Load lookup table to Peritek display
LOGSTR	General logarithm stretch
LOWTRAN	Lowtran 7 - Atmospheric Transmittance and Radiance Model
LLXY	Compute line, sample from lat, lon for sinusoidal projection
MAPGRID	Create an image of a map projection grid
MF2	Function generator
MF2SPEC	A linear combination of up to 5 Daedalus spectrometer files
MGNCORR	Compute sigma zero and other things from Magellan data
MINMAX	Find minimum and maximum DN's in an image
MIXER	Create images of component proportions and sums of squares of residuals
MODCOL	Modify colors in an image by changing brightness
PACK	Pack records in a file
PASTE	Move a section of one image into another existing image
PHOTO	Photograph images using Matrix QCR film recorder
PICS2RASTER	Convert PICS image to unlabeled raster file
PICSCAN	Scan labels on a PICS tape
PRNCMP	Principal component analysis
PSCAN	Scan labels on a PICS tape
PWRSTR	General power-law stretch
QPOLREAD	Read quad-pol radar tape
QPOLSYN	Convert quad-pol data to PICS image
QPOLWRITE	Write quad-pol radar file to tape in original format
RASTER2PICS	Convert raster (unlabeled) image file to PICS image
RAV	Read VICAR-labeled AVIRIS tape
READMGN	Read Magellan MIDR framelets from CD-ROM
READSPEC	Read spectra files to produce a reflectance file
RGB	Color separates from single input
SAVELUT	Save lookup table from Peritek
SCANLAB	Scan labels of Viking Orbiter images on VSFEDR tapes
SHRINK	Decrease the size of an image
SOMTRAN	Transform a Landsat image from SOM to sinusoidal projection
STATS	Compute statistics within a window for a set of images
STR	Stretch the contrast of an image
TDEAD	Cratering model
TIMSCAL2	Calibrate TIMS data to ground radiance, ground temperature, or emittance
TLIB	Reusable tape library
TRELAX	Crater relaxation model
TSCAN	Scan any tape for number of files, records/file, and bytes/record
UNLEAF	Separate one band-interleaved image into individual bands

UNPACK	Unpack logical records in a file
VICAR2PICS	Convert VICAR image to PICS image
VICARTYPE	Type VICAR label embedded in an image
VL2PICS	Convert Viking Lander image to PICS image
VLNREAD	Read Viking Lander tape and update log file
VLREFL	Calibrate Viking Lander image
VOESCAN	Scan labels of Viking Orbiter images on VSFEDR tapes
XYLL	Compute lat, lon from line, sample for sinusoidal projection